

I/O CIRCUIT USING LOW VOLTAGE TRANSISTORS WHICH CAN
TOLERATE HIGH VOLTAGES EVEN WHEN POWER SUPPLIES ARE
POWERED OFF

ABSTRACT OF THE DISCLOSURE

An apparatus for providing bias voltages for input/output (I/O) connections on low voltage integrated circuits. In one embodiment, the invention comprises an I/O pad, a pull-down transistor device that has a protective transistor coupled to said I/O pad, and a pull-up transistor device that has a second protective transistor, coupled to said I/O pad. A first switch coupled to the first protective transistor is responsive to a first supply voltage, a second supply voltage, and a reference voltage. Likewise, a second switch coupled to the second protective transistor is responsive to the first supply voltage and the reference voltage. A first self-bias circuit is also coupled to the first switch, wherein said the self-bias circuit uses a voltage at said I/O pad to bias the first protective transistor when both of the first and second supply voltages are powered off. Likewise, a second self-bias circuit coupled to the second switch, wherein the second self-bias circuit also uses the voltage at the I/O pad and an output of the first self bias circuit, to bias the second protective transistor when the first supply voltage is powered off.